

**PRELIMINARY ENHANCED TRAFFIC MANAGEMENT SYSTEM-to-
INTERNATIONAL DATA PROVIDER (ETMS-to-IDP)
INTERFACE CONTROL DOCUMENT (ICD)
FOR
TRAFFIC FLOW MANAGEMENT INFRASTRUCTURE (TFMI)**

Prepared for:

Federal Aviation Administration

Prepared by:

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**ENHANCED TRAFFIC MANAGEMENT SYSTEM-to- INTERNATIONAL
DATA PROVIDER (ETMS-to-IDP) INTERFACE CONTROL DOCUMENT
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Interface Control Document

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PROVIDER (ETMS~~-to-~~IDP) INTERFACE CONTROL DOCUMENT (ICD) FOR TRAFFIC FLOW
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INTERFACE CONTROL DOCUMENT

APPROVAL SIGNATURE PAGE

Revised Preliminary Enhanced Traffic Management System – to – International Data Provider
(ETMS-TO-IDP) Interface Control Document (ICD) for Traffic Flow Management Infrastructure
(TFMI)

APPROVAL SIGNATURES		
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Section 1 ~~3/4~~ Introduction

This section identifies the scope, purpose, and organization of this *Interface Control Document (ICD)* and the subsystem responsibility list.

1.1 Scope

This ICD provides the design characteristics of the interface between the Enhanced Traffic Management System (ETMS) and the International Data Provider (IDP) sites, e.g. Mexico, London. An IDP site would typically be connected to an ETMS Hub facility and provide real-time traffic management information to the ETMS.

The purpose of this ICD is to formally specify

- Interface connectivity between the ETMS and the IDP
- Detailed format of messages that are transmitted between the IDP sites and the ETMS

This ICD was prepared in accordance with FAA-STD-025d.

1.2 Document Organization

This ICD is organized into six sections:

Section 1, Introduction, describes the purpose, organization and scope of this ICD.

Section 2, Referenced Documents, provides a listing of referenced government and non-government documents, and document sources.

Section 3, Interface Design Characteristics, identifies and describes the general, functional design, and physical design characteristics for the ETMS-to-IDP interface.

Section 4, Quality Assurance Provisions, contains quality assurance provisions for the ETMS-to-IDP interface.

Section 5, Preparation for delivery.

Section 6, Acronyms and Abbreviations, provides a list of acronyms used in this ICD.

Appendices, TZ Message and NAS Field Format

1.3 Subsystem Responsibility List

The following table provides the list of ETMS external system interfaces and identifies the responsible Federal Aviation Administration (FAA) and Department of Transportation (DOT) organizations.

System	Name	Responsible Organization
ETMS	Enhanced Traffic Management System	AUA-700
IDP	International Data Provider	AUA-700

Note: The IDP end of this interface will normally be with a non-US Government entity and the technical description provided here is for a starting point only. The FAA will enter into formal agreements with the IDP that may not follow the details provided in this ICD exactly.

Section 2 ~~3~~4 Applicable Documents

The following documents form a part of this ICD to the extent specified herein. In the event of a conflict between the documents referenced herein and the contents of this ICD, the contents of this ICD will supersede the other documents.

2.1 Government Documents

FAA Standards

FAA-STD-005d	<i>Preparation of Specifications, Standards and Handbooks, 1996</i>
FAA-STD-025d	<i>Preparation of Interface Documentation, 1995</i>
FAA-STD-039b	<i>Open Systems Architecture and Protocols, 1996</i>
FAA-STD-043b	<i>Open System Interconnect Priority, 1996</i>
FAA-STD-045	<i>OSI Security Architecture, Protocol and Mechanisms, 1994</i>

Volpe National Transportation Systems Center (VNTSC) Documents

VNTSC-DTS56-TMS-004	<i>Enhanced Traffic Management System (ETMS), Reference Manual, Version 7.4, May 2002</i>
Volpe Center-DTS56-TMS-008	<i>ETMS System Design Document, Version 6.0, Draft, March, 1999</i>

National Airspace System (NAS) Documents

NAS-MD-315	<i>National Airspace System En Route Configuration Management Document, Computer Program Functional Specifications: Remote Outputs, November 20, 1997</i>
NAS-MD-312	<i>National Airspace System En Route Configuration Management Document, Computer Program Functional Specifications: Route Conversion and Posting, 16 August 1993</i>
NAS-MD-311	<i>National Airspace System En Route Configuration Management Document, Computer Program Functional Specifications: Message Entry and Checking, 20 November 1997</i>

Aircraft Situation Display To Industry Subsystem of the Enhanced Traffic Management System: Interface Control Document, Version 3.1, October 1999

DOC 4444-RAC/501

Rules Of The Air and Air Traffic Services, 13th Edition (1996) Amendments up to #3, 10/99. This document describes all the referenced ICAO messages in detail.

2.2 Non-government Documents

International Organization for Standardization (ISO)

ISO/IEC 7498-1

Information Processing Systems – Open Systems Interconnect – Basic Reference Model, 1993

2.3 Document Sources

This subsection provides sources for FAA and ISO documents.

2.3.1 Source of FAA Documents

Copies of FAA specifications, standards and publications may be obtained from the Contracting Officer, Federal Aviation Administration, 800 Independence Avenue S.W., Washington, DC, 20591. Requests should clearly identify the desired material by number and date and state the intended use of the material.

2.3.2 ISO Documents

Copies of ANSI and ISO standards may be obtained from the American National Standards Institute, 11 West 42nd Street, New York, NY, 10036.

2.3.3 IEEE Documents

Copies of IEEE standards may be obtained from the Institute for Electrical and Electronics Engineers, IEEE, 445 Hoes Lane, Piscataway, NJ 08855-1331 USA or by visiting their website at: <http://www.ieee.org/>.

2.3.4 TIA/EIA Documents

TIA/EIA Standards may be obtained from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112.

Section 3 ~~3/4~~ Interface Design Characteristics

This section provides the general, functional, and physical interface characteristics for the ETMS interface with the IDP sites. This interface provides an exchange of message data between ETMS and IDP sites using Transmission Control Protocol/Internet Protocol (TCP/IP).

3.1 General Characteristics

ETMS sites in Canada, Great Britain, and Mexico are just like other 'field sites' with regards to ETMS. TMUs located at these international sites are involved in the planning and implementation of traffic management initiatives. The international sites provide flight plans, departure information, and track updates to ETMS and can see all flights except military flights on the Traffic Situation Display (TSD). The Canadian sites are connected to Volpe via dedicated lines. The Canadian system provides the full NAS message set from its 7 operational centers: Gander, Moncton, Montreal, Toronto, Winnipeg, Edmonton, and Vancouver.

The British and Mexican sites access ETMS via Virtual Private Network (VPN) connections. The VPN is established through the Internet. The *only* Internet services provided are data transport and switching associated with the VPN. There is no dependence on the Internet Service Provider (ISP) for security services. London and ETMS secure the connection by establishing a firewall-based VPN through the Internet. This is a growing standard commercial practice for business-to-business use of the Internet. In the case of ETMS, the VPN vehicles are Firewall installations in London and at the ETMS Hub, at Volpe in Cambridge, MA. The VPN technology uses the IP Security Protocol (IPSEC) suite to set up an encrypted tunnel through the Internet. The ETMS Hub is operated by VNTSC.

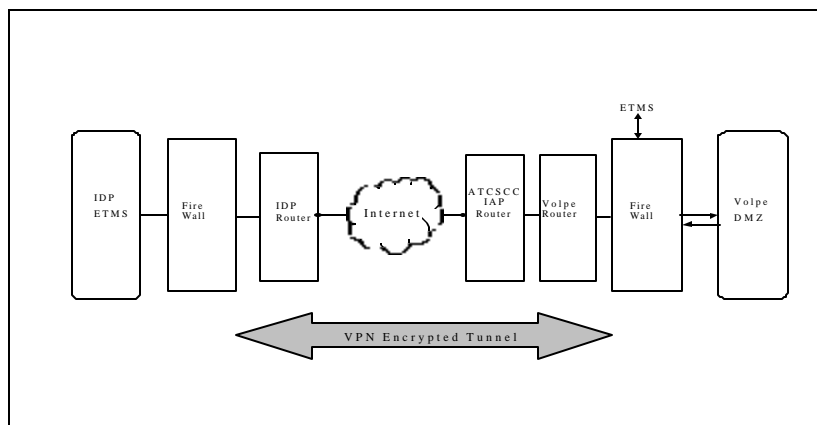


Figure 3 **Section 3 Interface Design Characteristics-1 ETMS-to-IDP Interface Connections**

3.1.1 Computer-Human Interface (CHI) Characteristics

This subsection is Not Applicable (NA).

3.2 Functional Design Characteristics

Figure 3-1, ETMS-to-IDP Interface Connections, shows the physical connectivity between ETMS and IDP systems. It conveys the following three key features of the interface:

- The end systems
- The physical connection
- The point of demarcation

The end systems represent the ETMS (including ETMS at the Volpe Hub and at the Air Traffic Control System Command Center (ATCSCC)) and the IDP site. As indicated in the diagram, this ICD defines the interface relationship between ETMS and the IDP.

The demarcation point, shown as a solid bullet, has a logical and physical meaning. Logically, it is the point at which information content such as the messages and data, whose characteristics are defined in this document, are exchanged between the end systems. Physically, it represents a connector at the end of the cable that connects to a physically protected connector on or within the transmission equipment. The physical demarcation point of the ETMS-to-IDP interface is at the cable connection at the routers.

3.2.1 Application Processes

This subsection identifies the application processes associated with both subsystems, the detailed information exchanged between them, and the Open Systems Interconnect (OSI) model data interface information.

3.2.1.1 Information Unit Segmentation

The ETMS-to-IDP Application Processes (APs) are not required to perform message segmentation.

3.2.1.2 Information Flow

Messages can be initiated from either side.

3.2.1.3 Frequency of Transmission

The messages across the ETMS-to-IDP interface are not periodic messages. They are exchanged as needed.

3.2.1.4 Responses

No response messages are exchanged between ETMS and IDP at the application level.

3.2.1.5 Quality of Service

The quality of service provided by ETMS-to-IDP interface conforms to the category of service defined as “NAS essential”.

3.2.2 OSI Type Data Interface

The ETMS-to-IDP interface communications functions will be implemented according to the OSI model as defined in the NAS OSI Architecture and protocols document, FAA-STD-0039B.

3.2.2.1 Application Layer

The TBD AP performs the application layer protocol conversion required between the ETMS and IDP messages.

3.2.2.2 Presentation Layer

This ICD imposes no specific presentation layer requirements on the ETMS-to-IDP interface.

3.2.2.3 Session Layer

This ICD imposes no specific session layer requirements on the ETMS-to-IDP interface.

3.2.2.4 Transport Layer

This ICD imposes no specific transport layer requirements on the ETMS-to-IDP interface.

3.2.2.5 Network Layer

This ICD imposes no specific network layer requirements on the ETMS-to-IDP interface.

3.2.2.6 Data Link Layer

This ICD imposes no specific data link layer requirements on the ETMS-to-IDP interface.

3.2.2.7 Physical Layer

The physical layer interface between ETMS and IDP interface consists of a single serial cable providing speeds from 64 Kbps to 1024 Kbps depending on the provider's communications service capability.

3.2.3 Analog Type Interface

This subsection is NA.

3.2.4 Discrete Type Interface

This subsection is NA.

3.3 Physical/ Electrical Characteristics

The interface shall conform to the electrical and physical constraints of the EIA Standard RS-232C. Specifically, the interface shall be an asynchronous serial interface. The nominal connector is a 9 Pin 'D' shell connector, which will use female connectors when connecting to the nine-pin male connector on a standard PC. The ETMS computer will read on pin 2 and write on pin 3. The only other pin needed is pin five for grounding. If a similar computer is connected without modem type equipment, the cable should be in the "null modem" configuration with pins two and three crossed over from opposite ends of the cable. The line speed shall be the same for both transmit and receive signals with an agreed upon speed.

3.3.1 Packet Level

- 3.3.1.1 All characters on this interface shall be defined in the ASCII character set. Each character on the interface shall be composed of one start bit, eight data bits, and one stop bit. There shall not be any parity bit.
- 3.3.1.2 All characters must be printable ASCII with the exception of any framing bytes, flow control bytes and CR/LF (carriage return/line feed).
- 3.3.1.3 All characters being exchanged over this interface shall be encapsulated within packets.
- 3.3.1.4 A packet shall begin with the ASCII Start-of-Text (STX) (02 hex) framing byte. It shall be followed by a three digit ASCII sequence number (e.g. '123') and a one-character packet type. Immediately following the packet type shall be the Traffic Management message. The packet shall be terminated with the ASCII End-of-Text (ETX) (03 hex) framing byte.
- 3.3.1.5 The first sequence number sent after software initialization shall be '000'. The sequence number shall increase to '001' and so on until it reaches '999'. The sequence number after '999' is '000'.
- 3.3.1.6 The interface shall have no characters between the ETX terminating one packet and the STX marking the beginning of the next packet.

3.3.2 Protocol Level

There are two levels of protocol. The first level is the data flow control, which prevents characters from overrunning system buffers. The second level is the transmission of messages from the IDP to the ETMS.

Note that there are two options: handshaking protocol and a no handshaking protocol. The handshaking protocol requires every message to be acknowledged and allows for message re-transmission. The no handshaking protocol can sense missing messages but has no means to request a re-transmission.

3.3.2.1 Data Flow Control

The interface shall implement software flow control to prevent character overruns. The ASCII flow control bytes XON (DC1) (11 hex) and XOFF (DC3) (13 hex) will be used to start and stop the transmission of characters from the IDP to the ETMS. The IDP will recognize the XOFF character from the ETMS and will stop the transmission of subsequent characters until a XON character is received. Due to various system buffering constraints, an XOFF may not immediately suspend the transmission of data and allowance should be made for receiving some characters after transmitting the XOFF signal. The XON and XOFF characters are used solely for the protocol interface and shall be removed from the stream of data bytes. The XON and XOFF characters shall be removed from the data stream by the low level protocol and cannot appear in a protocol packet.

3.3.2.2 Handshaking Protocol

The handshaking protocol requires that the transmitting system, the IDP, maintain a timer and copy of the last message sent. The message will be re-transmitted when no acknowledgment is received within the timeout period or when a re-transmission request is received from the ETMS data acquisition system. The message will be discarded when too many re-transmission attempts are made.

3.3.2.2.1 Data Message buffering

The IDP will buffer each data message to be transmitted to the ETMS. Each message will receive a three-digit ASCII sequence number. The messages must be sent to the ETMS in the order in which they were buffered (first-in/ first-out). The IDP shall size its buffers to a reasonable level and shall discard the oldest position messages first in the case of buffer overflows. If there are no remaining position reports to be discarded when the buffer overflows, the oldest message should be discarded in a first-in/ first-discarded fashion. Position reports are the most expendable messages since an updated position report should be received within minutes.

3.3.2.2.2 Protocol Packets

Each message will be encapsulated into a data packet. The data packet is then transmitted across the asynchronous serial connection. The following table contains the valid one-character packet types:

Character	Direction	Meaning
D	IDP -> ETMS	First attempt to send the packet
R	IDP -> ETMS	Re-transmission of data packet
X	IDP -> ETMS	First attempt to send packet, previous packet lost
A	ETMS -> IDP	Acknowledgment of packet

N	ETMS -> IDP	Request re-transmission
B	IDP -> ETMS	Initialize/reset (packet sequence '000')
B	ETMS -> IDP	Initialize/reset (sequence '000')
T	ETMS -> IDP	Test (are you alive?) (Sequence '000')
W	IDP -> ETMS	Test Response (I'm alive) (sequence '000')

3.3.2.2.3 D Packet Processing

Whenever the IDP has a message to send and there is no unacknowledged (*outstanding*) message on the interface, it will transmit a 'D' packet 'first attempt to send the packet' with a sequence number one higher than the last transmitted packet. It will then set a timeout timer of TBD seconds and a retry count of zero. If the timer expires with no acknowledgment ('A') from the ETMS, the next transmission of the message will be made by the 'R Packet Processing' logic, see below.

3.3.2.2.4 R Packet Processing

Whenever the IDP times out a message, it shall check the retry counter on the message, if it has exceeded the maximum number of retries (TBD), the message is discarded and a lost message flag is set. Otherwise a re-transmission of the message will occur with a packet code of 'R'. The retry count on the message must then be incremented.

3.3.2.2.5 X Packet Processing

Whenever the IDP has a message to send and there is no outstanding message on the interface and the lost message flag is set, it will transmit an 'X' packet 'first attempt to send the packet, previous packet lost' with a sequence number one higher than the last attempted packet. It will then set a timeout timer of TBD seconds and a retry count of zero. If the timer expires with no acknowledgment ('A') from the ETMS, the next transmission of the message will be made by the 'R Packet Processing' logic.

3.3.2.2.6 A Packet Processing

The ETMS will format and ship back to the IDP an 'A' packet, 'acknowledgment of packet' with the received sequence number whenever it sees a 'D', 'R' or 'X' packet. The ETMS will sense and discard any recently received duplicate sequence numbers, but it will always acknowledge all properly framed data (D, R, X) packets. The IDP will then discard the message with the matching sequence number and clear the line for the next message to be transmitted.

3.3.2.2.7 N Packet Processing

The ETMS will format and ship back to the IDP an 'N' packet, 'Request Re-transmission' with the sequence number of the last received and acknowledged valid data packet whenever the framing of a received packet can not be determined, e.g. an ETX when no STX found, No valid packet type, sequence number not digits. The IDP will then follow the 'R' packet processing logic.

3.3.2.2.8 B Packet Processing

Either system can re-synchronize the interface by sending a 'B' 'initialization / reset' packet. This causes all protocol states, timers and counters to be cleared. The IDP, after sending a 'B' packet, will

number its next data packet '001'. The IDP shall not send a re-transmit as the next packet. The ETMS after sending a 'B' packet will not perform duplicate packet sending on the next packet.

The 'B' packet performs two distinct roles, one is to inform the other side that the software is ready after startup/initialization; the other role is to re-synchronize the protocol to a known state.

3.3.2.2.9 T Packet Processing

The ETMS will format and ship a 'T' packet, 'are you alive' after TBD seconds of no data (no_data_timeout) from the IDP. The ETMS will declare the interface down if no 'W' packet is received within TBD seconds (t_packet_timeout).

The ETMS will reset the no_data_timeout after each 'D', 'R' and 'X' packet that is received. The IDP will reply with a 'W' packet signifying that the interface is intact and operational.

3.3.2.2.10 W Packet Processing

The IDP, upon receipt of a 'T' packet from the ETMS, will send a 'W' packet as the next packet to be shipped. The 'W' packet has a higher precedence than all other packets. A 'W' packet must be received by the ETMS within TBD seconds (t_packet_timeout) or the ETMS will declare the interface down.

3.3.2.2.11 IDP Logical Protocol Flow

Figure 3-2 is the logical protocol flow diagram for the IDP. It presumes that any received packet has already been validated for format.

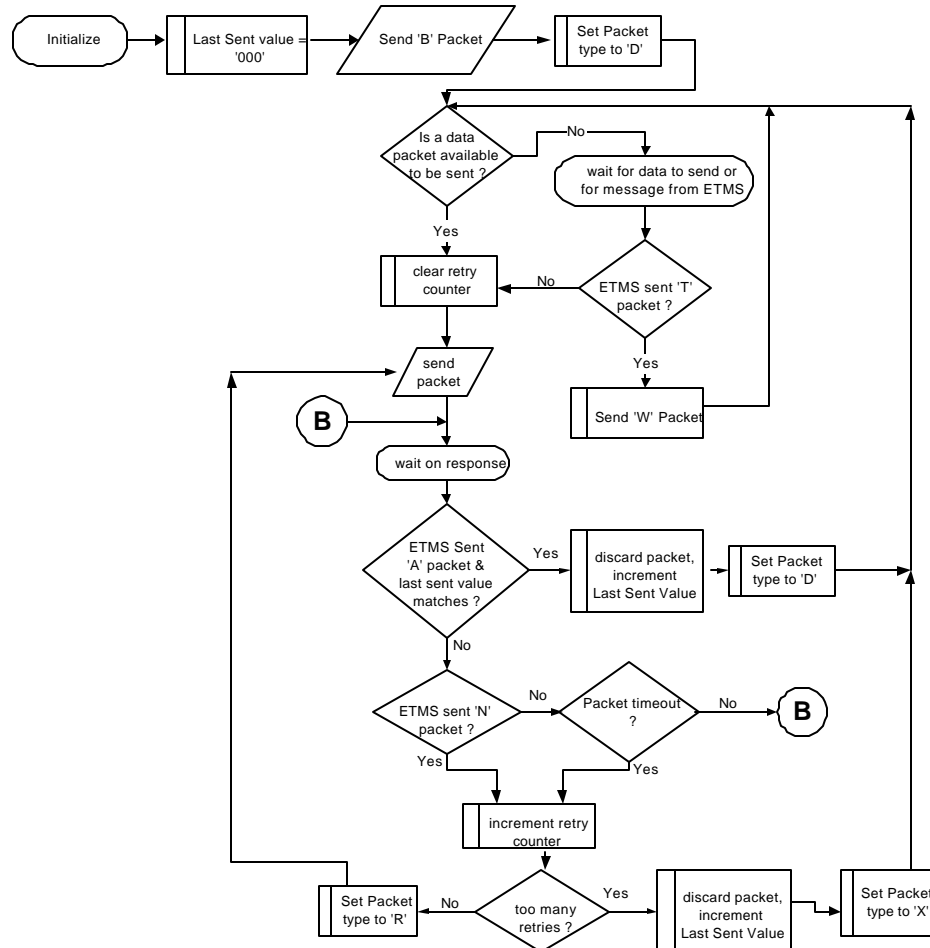
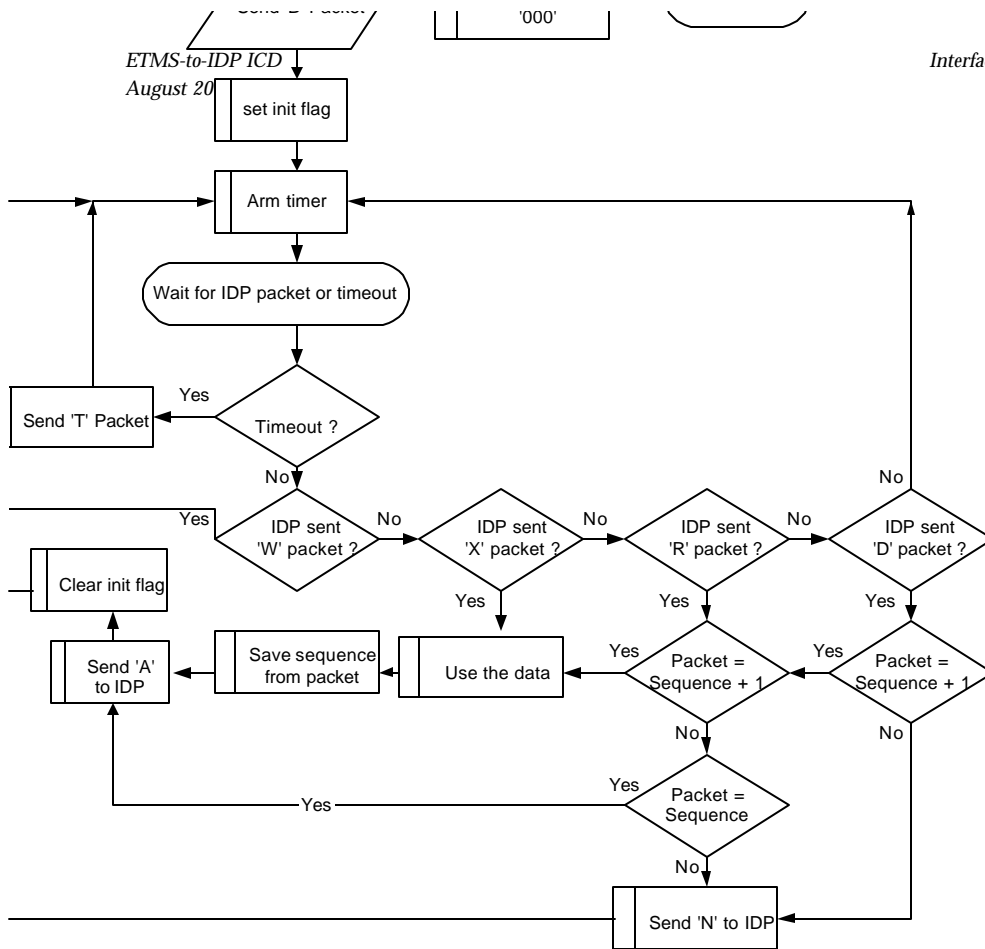


Figure 3-2. IDP Logical Protocol Flow



3.3.2.2.12 ETMS Logical Protocol Flow

Figure 3-3 is the logical protocol flow diagram for the ETMS. It presumes that any received packet has already been validated for format

Figure 3-3. ETMS Logical Protocol Flow

3.3.2.3 No Handshaking protocol

The no handshaking protocol is a one-way data transmission system from the IDP to the ETMS. There is no manner in which the ETMS can request the re-transmission of missing messages. This is the non-preferred method of data interchange.

3.3.2.3.1 Message buffering

The IDP will buffer each message to be transmitted to the ETMS. Each message will receive a three-digit ASCII sequence number. The messages must be sent to the ETMS in the order in which they were buffered (first in / first out).

3.3.2.3.2 Protocol Packets

Each message will be encapsulated into a data packet. The data packet is then transmitted across the asynchronous serial connection. The following table contains the valid one-character packet types:

Character	Direction	Meaning
D	IDP -> ETMS	Data packet
B	IDP -> ETMS	Initialize/reset (packet sequence '000')

3.3.2.3.3 D Packet Processing

Whenever the IDP has a message to send it will transmit a 'D' packet 'data packet' with a sequence number one higher than the last transmitted packet.

3.3.2.3.4 B Packet Processing

The IDP can re-synchronize the interface by sending a 'B' 'initialization / reset' packet. This causes all protocol states, timers and counters to be cleared. The IDP, after sending a 'B' packet, will number its next data packet '001'. The 'B' packet informs the ETMS that the IDP software is ready after startup/initialization.

3.3.3 Handshaking or No Handshaking Protocol

The ETMS shall interface with either protocol. The preferred protocol is the Handshaking protocol in that it minimizes message loss. The ETMS can sense missing messages with the no handshaking protocol, but it has no way of correcting the message loss.

3.4 IDP to ETMS Messages

The IDP to ETMS interface shall use International Civil Aviation Organization (ICAO) message types. The table below lists the supported ICAO messages and the derived ETMS data types.

3.4.1 Types of messages

ICAO	ETMS	Description
FPL/CPL/RPL	FZ	Flight Plan
CHG	AF	Flight Plan Modification
DEP	DZ	Departure
ARR	AZ	Arrival
N/A	TZ	Track Position
CNL	RZ	Cancel
CLR	N/A	Clearance
DLY	N/A	Delay

The actual message formats are detailed in NAS-MD-315 External Outputs and ICAO Annex 11.

3.4.2 Message Translation

- 3.4.2.1 The ETMS interface shall receive the above ICAO message types and translate them in real-time to the equivalent ETMS message types.
- 3.4.2.2 The ETMS must translate and verify the messages at their point of entry into the ETMS. *Some differences in content may require changes to ETMS hub site processing to accept translated messages (e.g. ICAO DEP messages do not contain an aircraft type, the resultant DZ now utilizes a special flag to indicate this fact.)*

3.4.3 Message Verification

Each message received by the translation software will be translated and then verified for field validity at the local ETMS facility. Geographic items cannot be verified for validity, only for format within the scope of this ICD.

3.4.4 Message Quantity

- 3.4.4.1 The ETMS interface shall be capable of receiving position reports on at most TBD simultaneous flights.
- 3.4.4.2 Position reports on specific aircraft shall be adjustable with the rate being configurable. The valid rates shall be in one-minute increments from one report (for each flight) every minute up to one report every five minutes. The nominal value will be one report every minute per aircraft flight. These rates are subject to the capacity of the serial line's interface speed.
- 3.4.4.3 All other message types shall be conformant to ICAO Annex specifications for frequency of the associated message types.

3.5 Traffic Management Messages

This section lists the Traffic Management Messages that the International Data Provider (IDP) will send to the ETMS. The majority of the specifications can be found in the following document:

“Doc 4444-RAC/501”
“PROCEDURES FOR AIR NAVIGATION SERVICES”
“RULES OF THE AIR AND AIR TRAFFIC SERVICES”
“THIRTEENTH EDITION — 1996” or later

Published by the INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO), this will be referred to as the “ICAO specification”. The relevant information has been included as an appendix to this document. The section headers beginning with ‘ICAO:’ are followed by the sections in the ICAO specification that describe the message type. Appendix 2 of the ICAO specification describes each message in detail.

3.5.1 Flight Plan (ICAO: filed flight plan messages (4.2.2.2), current flight plan messages (4.2.3.2), repetitive flight plan 8.4.2)

- 3.5.1.1 The IDP shall transmit flight plans (Message types FPL, CPL and RPL) in conformance with the ICAO specification for format and generation.
- 3.5.1.2 The ETMS shall translate FPL messages into NAS FZ messages.
- 3.5.1.3 The ETMS shall translate CPL messages into NAS FZ messages, if the message did not originate from the IDP providing the data.
- 3.5.1.4 The ETMS shall translate RPL messages into NAS FZ messages, if the message does not cause duplications of ETMS flight plans.

3.5.2 Flight Plan Modification (ICAO: modification messages (4.2.2.4))

- 3.5.2.1 The IDP shall transmit flight plan modifications (Message type CHG) in conformance with the ICAO specification for format and generation.
- 3.5.2.2 The ETMS shall translate the CHG into the NAS AF message where the information in the CHG corresponds to standard ETMS AF fields.
- 3.5.2.3 The ETMS hub-site processing will be modified to accept space fillers on any fields that are missing from the ICAO message but are needed on the NAS message.

3.5.3 Departure (ICAO: departure messages (4.2.2.6))

- 3.5.3.1 The IDP shall transmit departure messages (Message type DEP) in conformance with the ICAO specification for format and generation.
- 3.5.3.2 The ETMS shall translate the DEP into the NAS DZ message.

3.5.4 Arrival (ICAO: arrival messages (4.2.2.7))

- 3.5.4.1 The IDP shall transmit arrival messages (Message type ARR) in conformance with the ICAO specification for format and generation.
- 3.5.4.2 The ETMS shall translate the ARR into the NAS AZ message.
- 3.5.4.3 The ETMS hub-site processing will be modified to accept space fillers on any fields that are missing from the ICAO message but are needed on the NAS message.

3.5.5 Cancel (ICAO: flight plan cancellation messages (4.2.2.5))

- 3.5.5.1 The IDP shall transmit cancellation messages (Message type CNL) in conformance with the ICAO specification for format and generation.
- 3.5.5.2 The ETMS shall translate the CNL into the NAS RZ message.
- 3.5.5.3 The ETMS hub-site processing will be modified to accept space fillers on any fields that are missing from the ICAO message but are needed on the NAS message.

3.5.6 Position Report

- 3.5.6.1 The IDP shall transmit position report messages (Message type TZ) in conformance with NAS-MD-315. The relevant information has been included as an appendix to the ETMS to IDP Interface Control Document (ICD).
- 3.5.6.2 The IDP shall transmit the latest received position report on each individual flight to the ETMS no more frequently than once a minute. This means that a position report on a specific flight cannot be transmitted to the ETMS faster than once every sixty seconds.
- 3.5.6.3 The IDP shall be adaptable to transmit the latest received position report on each individual flight in one-minute increments. This means that a specific flight's position can be reported every 60, 120, 180, 240 or 300 seconds.

3.5.7 Clearance (ICAO: clearance messages (4.2.5.2))

- 3.5.7.1 The IDP shall transmit clearance messages (Message type CLR) in conformance with the ICAO specification for format and generation.
- 3.5.7.2 The ETMS shall accept and forward CLR messages to the ETMS hub-site.
- 3.5.7.3 The ETMS hub-site processing will be modified to accept the CLR messages as needed.

3.5.8 Delay (ICAO: delay messages (4.2.2.3))

- 3.5.8.1 The IDP shall transmit delay messages (Message type DLY) in conformance with the ICAO specification for format and generation.
- 3.5.8.2 The ETMS shall accept and forward DLY messages to the ETMS hub-site.
- 3.5.8.3 The ETMS hub-site processing will be modified to accept the DLY messages as needed.

3.6 Coding and Testing

- 3.6.1 The IDP/ETMS interface shall require the implementation of the VPN from the IDP ETMS facility to the ETMS hub-site.

- 3.6.2 The IDP/ETMS interface shall be tested remotely, whenever feasible.
- 3.6.3 The ETMS software shall record every character received from the IDP into hourly files.
- 3.6.4 The hourly files collected from the interface shall be retrievable from the ETMS facility via the ETMS hub-site.
- 3.6.5 The derived data shall be provided locally at the ETMS facility for display.
- 3.6.6 The personnel at the remote facility shall dictate the availability of the data at the remote ETMS facility.
- 3.6.7 The IDP derived data shall be transmitted in real-time to the ETMS hub-site for use on testing and evaluation strings.
- 3.6.8 The ETMS software shall record the following at a minimum:
 - 3.6.8.1 Framing errors
 - 3.6.8.2 Malformed packets
 - 3.6.8.2 Lost packets
 - 3.6.8.3 Counts of each packet type
 - 3.6.8.4 Counts of each message type
 - 3.6.8.5 Translation statistics ordered and specific to each message type
 - 3.6.8.6 Inter-packet bytes
- 3.6.9 The ETMS software must record all input data messages and the derived messages into hourly log files.

3.7 Usability of Interface

- 3.7.1 The FAA shall determine whether the data is suitable to be included within the ETMS.
- 3.7.2 The remote users shall determine if the data is suitable for use at the IDP acquisition facility (the ETMS remote site in this document).

Section 4 ~~3~~4 Quality Assurance Provisions

This section provides the Quality Assurance Provisions for this Interface.

- 4.1 Each project is required to perform conformance testing.
- 4.2 Each project is required to perform interoperability testing at an FAA-approved test facility.

Section 5 ~~3~~4 Preparation for Delivery

This section is not applicable to this ICD.

Section 6 ~~3~~4 Notes

This section lists the acronyms and abbreviations used in this document.

6.1 Acronyms and Abbreviations

A/N	Alphanumeric character
ADJ	Adjustment message
AP	Application Process
ASCII	American Standard Code of Information Interchange
ATCSCC	Air Traffic Control System Command Center
ATS	Air Traffic System
CHI	Computer-Human Interface
CNX	Cancellation message
DOT	Department of Transportation
ECI	Electronic Communication Interface
EIA	Electronic Industry Association
ETMS	Enhanced Traffic Management System
EXC	Exchange message
FAA	Federal Aviation Administration
FIPS	Federal Information Processing Standards
IAP	Internet Access Point
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
IDP	International Data Provider
IEC	International Electro-technical Commission
IFCN	Inter-facility Flow Control Network
IFCNFE	IFCN Front End Processor
IPSEC	IP Security Protocol
IRD	Interface Requirements Document
ISO	International Organization for Standardization
ISP	Internet Service Provider
NA	Not Applicable
NAS	National Airspace System
NIST	National Institute of Standards and Technology
OSI	Open Systems Interconnect

PC	Personal Computer
PUB	Publication
RPL	Replacement message
RTR	Remote Transmitter/Receiver
SI	Substitution Insertion
STD	Standard
SUB	Substitution message
TCP/IP	Transmission Control Protocol/Internet Protocol
TFMI	Traffic Flow Management Infrastructure
TMU	Traffic Management Unit
VPN	Virtual Private Network
VNTSC	Volpe National Transportation Systems Center

Appendix A

TZ Message Format

The following information has been extracted from "Aircraft Situation Display To Industry Subsystem of the Enhanced Traffic Management System: Interface Control Document" Version 3.1, October, 1999

A.1 NAS TZ Message

Flow Control Track/ Flight Data Block Information (TZ) Messages are used to provide the ETMS with selected current track and flight data block information. TZ messages are transmitted to ETMS on a cyclic basis on all flat tracked and non-tentative free tracked eligible flight plans. The current frequency is one report every one to five minutes. The interval between reports is set by the sending facility.

TZ message transmissions on eligible flight plans will be terminated when a handoff to an adjacent center is accepted or the current clock time is greater than the outbound boundary crossing time, whichever occurs first. TZ message transmissions will be terminated from the non-ARTCC facilities under rules set locally at each facility.

A.2 TZ Field Format

Field No.	Function	Description	Bytes
01	Message Type	2 characters - TZ	2
	Field Separator	1 space	1
02*	Aircraft Identity	6-11 characters La (a)(a)(a)(a)(a) /dda	6-11
	Field Separator	1 space	1
05	Ground Speed	3 digits, ddd, if not available ddd will be 3 zeros	3
	Field Separator	1 space	1
08	Altitude	One of the following:	2-7
		a. (d)dd - altitude	
		b. (d)ddT - Interim altitude	
		c. (d)ddB(d)dd - a block of altitudes	
		d. (d)ddC - Reported Mode C altitudes when it is not within Altitude Conformance Limit (ALCT) feet of the assigned altitude	
	Field Separator	1 space	
23	Track Position	12 characters, latitude/ longitude in degree minutes	12
	Coordinates	dddddL/ ddddddL	

	Field Separator	1 space	
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*Field 02 can have one of the following four formats:

La(a)(a)(a)(a)	No CID, typically foreign data sources
La(a)(a)(a)(a)/000	There is no Host correlated flight plan, this is from an EARTS or an ARTS.
La(a)(a)(a)(a)/FFF	There is no Host correlated flight plan, data is from an ARTS facility only.
La(a)(a)(a)(a)/dda	The typical situation

Appendix B

B.1 NAS Field Formats

The following are the formats for each NAS field. This information was extracted from Appendix E of NAS-MD-311 document. This information was included to add further details to the table of NAS messages. If any questions should arise, please refer to the referenced NAS document for complete information.

The two-digit number on the left of each page is the NAS field number as was specified within each NAS message in the above referenced document.

Field No.	Function	Description
01	Message Type	Example:
		1. TZ
		2. FZ
	Message type designator	LL
02	Flight Identification	Example:
		1. AAL123
		2. UAL51/051
		3. AAL123/000

Field No.	Function	Description
		<p>4. For ETMS the following are the allowable combinations for Field 02:</p> <p>FZ DZ RZ AZ AF UZ TZ</p> <p>abd abd abd a abd a abd</p> <p>a</p> <p>a</p> <p>a</p> <p>a. Aircraft Identification -La(a)(a) Aircraft identification filed in a flight plan b. The element separator / (slash) c. Computer Identification- dda Computer Identification</p> <p>Note: Element d is the computer-assigned identification. A 'ddL' format will normally be used only when all numbers of the 'ddd' format are in use. The letters I and O will not be used.</p>

Field No.	Function	Description
05	Speed	<p>Example.</p> <ol style="list-style-type: none"> 75 565 M085 (MACH Speed) <ol style="list-style-type: none"> True Air dd(d)(d) File true airspeed in Knots Lddd Filed MACH Speed SC Classified Speed Ground Speed ddd Aircraft's Current Tracking Speed <p>Notes:</p> <ol style="list-style-type: none"> The four digits of filed true airspeed in Knots cannot exceed 3700. MACH Speed cannot have a value higher than M500.
08	Assigned Altitude	<p>Example:</p> <ol style="list-style-type: none"> 330 450B510 <ol style="list-style-type: none"> Altitude (d)dd Block of altitudes (d)ddB(d)dd Interim Altitude (d)ddT Reported Mode C altitudes when it is not within Altitude Conformance Limit (ALCT) feet of the assigned altitude (d)ddC <p>Notes:</p> <ol style="list-style-type: none"> Altitude is expressed in hundreds of feet The lower altitude is expressed first in block altitudes (i.e. before the B)
23	Track Position Velocity Components	<ol style="list-style-type: none"> Latitude/longitude in degrees/minutes ddddL/dddddL